Tektronix

TekScope® THS700 Series Handheld Digital Oscilloscopes

THS700 SERIES FEATURES

200, 100, and 60 MHz Bandwidth

1 GS/s, 500 MS/s, 250 MS/s Sampling Rates per Channel

Two Channels and Dual Digitizers

External Trigger

3-3/4 Digit DMM with Datalogger

Roll Mode

Extra Bright Backlit Display

8 ns Glitch Capture

Independently Floating Isolated Scope and DMM Channels for Safety

Advanced Trigger – Delay, Pulse, and Video (Line Count and Field Select)

21 Automatic Measurements

RS-232 Programmability/Communications

Deluxe Soft Case

NiCd Battery and AC Adapter

THS720P POWER MEASUREMENT FEATURES

Measures Harmonics up to 31st (50/60 Hz)

Automatic Power Measurement with Statistics

Full Floating Measurement Capability up to 600 V_{RMS}

1 kV High-voltage Probes (P5102)

PWM Electric Motor Drive Trigger

The Award Winning THS700 Series Now Includes:

- **200 MHz Version – The highest performance handheld scope in the market**
- **Power Version – The first handheld scope to provide automatic power measurements, statistics, and harmonics**

The TekScope® THS700 Series Scope/DMM combines a full-featured Digital Real-Time (DRT) oscilloscope with a True RMS digital multimeter in a rugged, handheld package. The family consists of four members:

- The THS700A models including the THS730A, THS720A, and THS710A with bandwidths of 200 MHz, 100 MHz, and 60 MHz respectively.
- The 100 MHz THS720P, provides the ONLY safe measurement solution for power electronics

The THS700A models are ideal for general purpose electronic field service applications. The 200 MHz THS730A delivers the bandwidth required to repair the high-speed electronics often found in modern medical equipment, communications equipment, and microprocessor-controlled equipment.

The THS720P offers the unique combination of safety features such as Isolated-Channel™ architecture, 100 MHz single-shot bandwidth to capture fast high-voltage signals, power measurements, and high-voltage probes (up to 1,000 V) to repair and service power electronic circuitry found in electric motor-drives, UPS (uninterruptable power sup-

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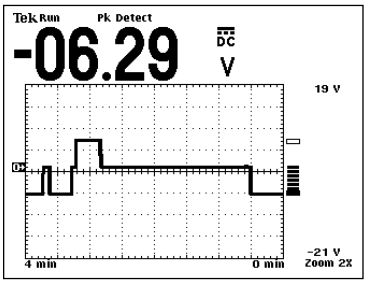
plies), and numerous other high-voltage, electronically controlled devices.

The Complete Product

All THS700 Series instruments have IsolatedChannel architecture to insure safety to the operator and the equipment-under-test. The scope and meter modes can operate simultaneously and independently on the same or separate signals. The high-resolution, backlit display and graphical interface with pop-up menus make it easy for users to take full advantage of the instrument's comprehensive features.

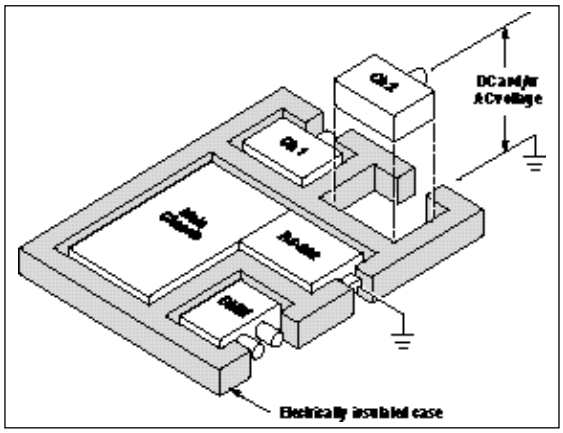
DMM Logger

The 3 3/4 digit DMM provides all the features that are expected from a DMM – plus a logger. The logger plots measurements graphically over a user-selectable time, ranging from four minutes to eight days. Data can be saved and retrieved later for analysis at the DMM's full resolution.



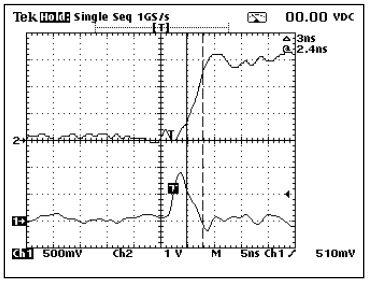
IsolatedChannel™ Architecture

The proprietary IsolatedChannel architecture provides a safe measurement environment, avoiding the inadvertent danger to personnel and damage to circuitry when working with a mix of low and high voltages or allowing non-invasive probing of "floating" differential communication links. The DMM input is isolated from the scope channels, allowing safe measurement of three independent sources.



Digital Real-time Sampling

The THS700 Series is the only handheld oscilloscope to offer Digital Real Time (DRT) sampling, allowing it to simultaneously capture single-shot signals on both channels to full bandwidth. This makes it possible to capture and analyze the most complex signals such as modulated signals or bursts of serial data and be sure that the signal captured on the second channel is time synchronized.



Advanced Triggering

The THS700 Series advanced triggering capabilities make the most difficult problems easy to find. With pulse-width triggering, elusive glitches on a digital signal, a drop-out on a power line, an unstable clock in a communication network – all can be readily detected and analyzed.

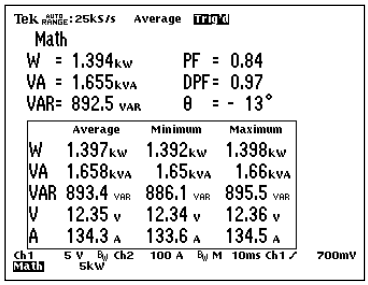
Video triggering allows triggering on all types of video signals from broadcast TV, video monitors, or high-resolution imaging systems. Both field and line can be selected for closer analysis – line count can be selected up to 1,500.

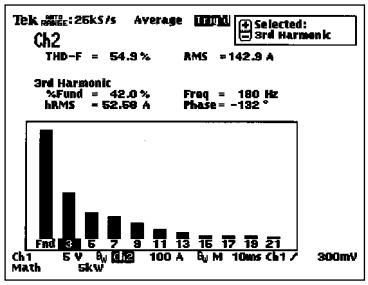
Power Measurements with the THS720P

Power electronics is pervading the industrial world and bringing a new set of measurement challenges including the ability to safely capture and measure fast switching high-voltage signals. Traditional power instrumentation doesn't have the bandwidth nor the sampling rate to measure such signals, while traditional oscilloscopes don't have the safety features, probes, or measurement capabilities to analyze these signals.

The THS720P brings these capabilities together by combining:

- 100 MHz bandwidth and 500 MS/s sampling rate to capture fast transients
- IsolatedChannel architecture (to perform high-voltage floating measurements) with common-to-common voltage differences up to 600 V
- Advanced triggering including motor trigger to trigger on complex three- or five-level pulse-width modulated motor-drive output signals
- Comprehensive power measurement and analysis capability, enabling the analysis of harmonics on the line and current-vs-voltage relationship





Tekscope THS700 Series Characteristics

Oscilloscope Functions

Bandwidth –
THS730A: 200 MHz.
THS720A, THS720P: 100 MHz.
THS710A: 60 MHz.

Sample Rate (each channel) **–**
THS730A: 1 GS/s.
THS720A, THS720P: 500 MS/s.
THS710A: 250 MS/s.

Channels – Two.

Sensitivity – 5 mV to 50 V/div (to 500 V/div with 10X probe).

Position Range – ±10 div.

DC Gain Accuracy – ±2%.

Vertical Resolution – 8-Bits.

Record Length – 2,500 points.

Time/Division Range –
THS730A: 2 ns to 50 s/div.
THS720A, THS720P: 5 ns to 50 s/div.
THS710A: 10 ns to 50 s/div.

Horizontal Accuracy – ±200 ppm.

Roll Mode – ≥ 0.5 s/div.

Autorange – User-selectable.

Trigger Modes – Auto, Normal.

Trigger Types – Edge, Pulse, Video, External.

Video Trigger Formats and Field Rates – Selectable odd or even field, lines, or line number up to 1,500.

External Trigger Input – 5 MHz TTL-compatible. Selectable 200 mV or 2 V trigger level.

Motor Trigger (THS720P only) **–** Triggers on 3- and 5-level pulse-width modulated power signal.

Waveform Processing – Add, Subtract, Multiply, Calculate Watts = V x I.

Waveform Storage – 10 waveforms.

Acquisition Modes – Sample, Envelope, Average, Peak Detect.

Cursor Measurements – ΔVolts, ΔTime, 1/ΔTime (Hz), Degree (phase).

Cursor Types – Horizontal Bars, Vertical Bars, Paired (volts @ time).

Display System –
Interpolation:Sin(x)/x.
Mode:Vector, Dot, Vector Accumulate, Dot Accumulate.
Format:YT and XY.

Automatic Measurements –

Period	Frequency
+Width	Rise Time
–Width	Fall Time
+Duty Cycle	+Overshoot
–Duty Cycle	–Overshoot
High	Max
Low	Min
Peak-to-Peak	Amplitude
Mean	RMS
Cycle Mean	Cycle RMS
Burst Width	

Power Measurement (THS720P)

Harmonics – Up to 31st (50/60 Hz).

Harmonic Amplitude Accuracy (% of reading) **–**

Fundamental	2 - 11	12 - 21	22 - 31
±2%	±2%	±4%	±6%

Harmonic Phase Accuracy (% of reading) **–**

Fundamental	2 - 11	12 - 21	22 - 31
–	±2%	±8%	±8%

Power Measurements –

W	True power
VA	Apparent power
VAR	Reactive power
V	Volts (RMS, Peak)
A	Amps (RMS, Peak)
THD-F	Total harmonic distortion as a percentage of the fundamental (accuracy ±4%)
THD-R	Total harmonic distortion of the RMS of the input signal (accuracy ±4%)
PF	Power factor (accuracy ±4%)
DPF	Displacement power factor
ϕ	Phase difference between the voltage and current

DMM Specifications

DC Voltage Ranges – 400.0 mV to 880 V.

DC Volts Accuracy – ±(0.5% of reading + 5 counts).

True RMS AC Voltage Ranges – 400.0 mV to 640 V.

Maximum Float Voltage – 600 V_{RMS} each channel (probe dependent).

Resolution – 4000 count, 3-3/4 digits.

AC Volts Accuracy – ±(2% of reading + 5 counts).

Resistance Ranges – 400.0 Ω to 40.00MΩ.

Resistance Accuracy – ±(0.5% of reading + 2 counts); 40MΩ: ±(2% of reading + 5 counts).

Diode Test Range – 0 to 2 V.

Continuity Check – Audible tone when <50 Ω.

Modes – Min, Max, ΔMax-Min, Avg, Hold.

Non-volatile Storage – 10 DMM screenshots.

Vertical Zoom Capability – 2X, 5X, 10X.

dB Scale – Selectable, referenced from 1 mV to 10 V.

dBm Scale – Selectable, referenced from 50 Ω to 600 Ω.

Hardcopy Capability

Printer Formats – ThinkJet, DeskJet, LaserJet, Epson 9- or 24-pin, DPU 411/II and DPU 412 Thermal Printer.

File Formats – IMG, TIFF, PCX, BMP, EPS.

Hardcopy Layout – Landscape or portrait.

Programmability

Interface – RS-232.

Mode – Full talk/listen.

Baud Rate – Selectable from 300 to 38,400.

General Characteristics

Environmental

Temperature –
Operating: –10° C to +50° C.
Non-operating: –20° C to +60° C.

Humidity –
≤+40° C: ≤95% relative humidity.
+41° Cto +50° C: ≤75% relative humidity.

Altitude –
Operating: 2,000 m.
Non-operating: 15,000 m.

Random Vibration (test specifications) **–**
Operating: 2.66 g_{RMS}, 5Hz to 500 Hz, 10 minutes on each axis.
Non-operating: 3.48 g_{RMS}, 5Hz to 500 Hz, 10 minutes on each axis.

Drop Resistance (test specification) **–** Survives a 30-in. (76 cm) drop onto concrete with only cosmetic damage.

EMC – Meets Directive 89/336/EEC for electromagnetic compatibility.

Safety

Safety Certification – UL 3111-1 Listed, CSA Certified, complies with EN61010-1.

Power

Power Source – NiCd rechargeable battery pack with AC adapter (both included).

Battery Life – Approx. 2 hours from full charge.

Battery Charge Time –
Instrument operating: 9 hrs.
Instrument off: 9 hrs.
In external charger: 1.5 hrs.

Other

Setups – 10 front-panel setups.

Display – Backlit LCD.

Display Resolution – 320 x 240.

Physical

Dimensions	mm	in.
Width	177	6.95
Height	217	8.53
Depth	51	2.00
Weight	**kg**	**lb.**
Net	1.45	3.2

Ordering Information

THS730A, THS720A, THS720P, THS710A
Handheld Digital Oscilloscopes

Includes: Two P6117 10X Passive Probes (THS700A), Two P5102 10X High-voltage Probes (THS720P), User Manual, Quick Reference Manual, Standard Meter Lead Set, NiCd Rechargeable Battery Pack, AC Power Adapter, Soft Carrying Case, Cable and Adapters for RS-232, NIST-traceable Certificate of Calibration.

THS700 LANGUAGE OPTIONS

Option L1 – French User Manual.
Option L2 – Italian User Manual.
Option L3 – German User Manual.
Option L4 – Spanish User Manual.
Option L5 – Japanese User Manual.
Option L6 – Portuguese User Manual.
Option L7 – Simplified Chinese User Manual.
Option L8 – Traditional Chinese User Manual.
Option L9 – Korean User Manual.

THS700 INTERNATIONAL POWER ADAPTER OPTIONS

Option A1 – European power plug.
Option A2 – UK power plug.
Option A6 – Japanese power plug.

THS700 RECOMMENDED ACCESSORIES

P5102 (standard THS720P) **–** 10X 100 MHz Passive Probe for higher voltage application: 1000 V_{RMS} Tip-to-reference; 600 V RMS Reference-to-earth Ground (float).

A621, A622 – Current Probes for scope operation.

A605, A610 – Current Probes for DMM operation.

P6117 (standard THS700A) **–** 10X 200 MHz Passive Probe.

Battery Charger – THS7CHG.

Rechargeable Battery (replacement) **–** THS7BAT.

Hard Carrying Case – THS7HCA.

Standard Meter Lead Set (replacement) **–** 012-1482-00.

Deluxe Meter Lead Set – ATLDX1.

Programming Manual – 070-9751-00.

Service Manual – 070-9752-00.

Soft Carrying Case (replacement) **–** 016-1399-01.

Printer – HC411.

WaveStar Electronic Lab Notebook Software – WSTR31. Windows-based software to capture waveforms and settings from Tektronix DSOs.

WARRANTY

Three years (excluding probes).

For further information, contact Tektronix:

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